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Unconventional quantum oscillations in mesoscopic rings of spin-triplet superconductor Sr_2RuO_4[1] XINXIN CAI, YIQUN YING, NEAL STALEY, The Pennsylvania State University, YAN XIN, NHMFL, Florida State University, DAVID FOBES, TIJIANG LIU, ZHIQIANG MAO, Tulane University, YING LIU, The Pennsylvania State University — Spin-triplet superconductor Sr_2RuO_4 has been found to feature exotic vortex physics including the formation of vortex lattices at low fields and most recently, evidence for half-flux quanta trapped in a doubly connected sample. We carried out the magnetoresistance measurements in mesoscopic ring samples of Sr_2RuO_4 fabricated on mechanically exfoliated single crystals of Sr_2RuO_4 by photolithography and focused ion beam. With the magnetic field applied perpendicular to the in-plane direction, thin-wall rings of Sr_2RuO_4 were found to exhibit a large number of full-flux quantum oscillations with pronounced amplitudes unexpected from the conventional Little-Parks effect. Furthermore, in thick-wall rings, two distinct periods were observed in both resistance and critical current oscillations, which we attribute to the effect of vortices, namely, the "lock-in" effect of a vortex lattice in Sr_2RuO_4. No evidence for half-flux-quantum oscillations were identified in any sample measured so far without the presence of an in-plane field. The measurements with an in-plane field are being pursued.

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